142 students have completed the CofC BEAMS Program as of Spring 2017.

68 of the 124 students who have graduated (55%) are currently in the marine geospatial workforce in private, government or academic positions.

32 of these students (47%) are women.
Today’s Presentation

• BOEM has given a larger overall picture
• This talk:
  – Big picture for geological studies
  – Current projects
  – Data we have or are working towards
  – What studies are needed?
  – Data needs
  – Challenges and Opportunities
Today’s Presentation

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There is HUGE VALUE in these types of regional and localized studies
Big Picture: what studies?

Physical Nature of the System (ALL BASELINE)
- Seafloor habitats (rock, sand, grass)
- Sand for beach renourishment
- Mineral Resources (not a focus for this talk)
- Wind for energy (later talk)

Cultural Heritage Distributions
- Historic and Prehistoric

Natural Heritage

-REDUCE IMPACTS ON and USE ALL AREAS-
Current Projects

- BOEM Sand with SC DNR Geology
- BOEM Wind with SC Sea Grant
- Grainsize analysis of offshore cores
- Geoarchaeology and ancient landscapes
- Shorelines: Active beach over flights, historical data analysis
- Flooding: Storm surge mapping, normal tides

Geological Mapping, workforce training, etc.
Sand: Beach Renourishment

State Totals:
- Nourishment Episodes: 76
- Volume: 54,568,061 yd³
- Length: 953,367 ft / 180mi
- Nominal Cost: $308,347,002
- 2018 Real Cost: $433,592,526

http://beachnourishment.wcu.edu/oneState?state=SC
BOEM-DNR SAND Project (SC)
Paleochannels

**Figure 3b.** Chirp subbottom profile for line BOEM_Line_SC_006; digitized location of vibracore VC21.

**Figure 3c.** Chirp subbottom profile for line BOEM_Line_SC_006.
Subbottom profiling and Cores

$$ --?$$
WIND Project (SC)

• See talk later in meeting

(but enjoy this image off Charleston).

Harris et al. 2013
Cultural Heritage

- Historic
- Pre-historic
Ancient Shorelines

• Finding the ancient shorelines provides a baseline for:
  – Developing models for ancient geological landscapes and sedimentary deposits
  – Identifying potential human habitation sites
  – Gathering information on post-depositional processes (the modern system)
Recent Sea Level Rise

Harris et al., 2013
Ancient Shorelines

NOW

Estimated shoreline with adjustments for glacial isostatic adjustment

Harris, 2018
11,500 years ago

Estimated shoreline with adjustments for glacial isostatic adjustment

Positions on shelf likely +/- 10 km

Ancient Shorelines

Harris, 2018
Ancient Shorelines

Estimated shoreline positions are likely a bit inexact at this juncture of slope and transition.

Positions on shelf likely +/- 10 km

8,500 years ago

Estimated shoreline with adjustments for glacial isostatic adjustment

Harris, 2018
Ancient Shorelines

NOW

Shoreline has been close for ~6-8,000 years

Dating beach ridges from Winyah Bay to Edisto Island

Harris, 2018
SC BOEM ASAP data finds (SC DNR)

Before study

After compilation

Tweel et al., 2016
This map does not include any real-time datasets, such as those provided by SECOORA, but rather physical baseline data.
Data We are Working Towards
Data We Need

• Resource-scale information
• Initial depth maps for the whole region
  – Multibeam, LiDAR on clear-water days—really
• Sediment cover/thicknesses
• A clear understanding of the near-surface geology
• Well modeled seafloor features with an understanding of subsurface content
• Real-time data to understand change and dynamics.
Challenges

• Working with(in) certain sectors -- academe
• Getting good data, on time, without delay
• Available data– get it off the shelf and into hands of scientists and engineers
• Online access and easy to find data:
  – e.g., NOAA(!), BOEM, USGS(~), DNR, DHEC, Universities (ha!), SECOORA and IOOS(!!!)
Opportunities

• Working with certain sectors -- academe
• Ongoing federal coordination with States, such as in the SC DNR data projects
• A well-trained, skilled, and **supervised** workforce with our students
• Technology is changing daily, becoming small, and easily deployed from shore, small boats, autonomous craft, and buoys.
Best Program Qualities FTW! (for the win!)

• Good political leadership
• Good technical leadership
• Collaborative data gathering, processing, analysis, and interpretation
• Clear communication between partners
• Workflow for immediate data flow to archives (e.g. see SECOORA, NOAA)
• …and don’t just say it, make it work!
Thanks to our partners

College of Charleston, BEAMS, Geology, Archaeology, Grice Marine Lab
NOAA, Sea Grant, USGS, SCDNR-Geology, SCDNR-Fisheries, SCDHEC, NPS, Navy, SCIAA, U.S.C, CCU
SonarWiz, QPS, Hypack, Edgetech, Teledyne, R2Sonic, Seafloor Systems, USM
Eleven BEAM-Teams
Thank you

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